System of Rice Intensification (SRI) Method of Rice Cultivation

How to Produce More Rice with Less Inputs

A Field Extension Manual

Karma Lhendup, Faculty of Agriculture, College of Natural Resources
Royal University of Bhutan

The System of Rice Intensification is a new and promising resource-saving method of growing rice under irrigated or rain-fed conditions. Studies in a number of countries have shown a significant increase in rice yield, with substantial savings of seeds (80-90%), water (25-50%), and cost (10-20%) compared to conventional methods. SRI is not a technology, but a set of simple ideas and principles that help produce more productive and robust plants. The ideas are:

I. Transplant very young seedlings, raised in an un-flooded nursery. II. Transplant them carefully and shallow. III. Transplant single seedlings and at wider spacing than now. IV. Apply a minimum amount of water – no continuous flooding. V. Control weeds with active soil aeration. VI. Rely as much as possible on organic matter for soil fertilization. Steps 1 to 7 show SRI methods.

Step 1


Plate 1


Plate 2

Step 1

Nursery preparation using available inputs and methods (Plates 1, 2). Pre-soaking seeds in water for 24 hours and incubating in a rags for 24 hours before sowing in a well-drained, garden-like nursery helps seeds to germinate faster. Line or random sowing of seeds in nursery can be done (Plate 2).

Step 2


Plate 3


Plate 4

Step 2

Seedlings at 2-3 leaf stage, ready to be transplanted (Plate 3). Carefully remove seedlings along with soils using a shovel to avoid trauma to roots (Plate 4). Use a flat item to carry the seedlings to the field. Avoid damage to tender seedlings and their roots while transporting and don't let them become dried.

Step 3

Transplant young seedlings (2-leaf stage plant has the potential to attain 84 tillers) and do this carefully and singly at shallow depth (2-3 cm) in slightly slanting position without removing soil particles attached to the seedling roots into a well puddled and levelled field but not flooded (Plate 5). Use spacing of above 25 x 25 cm between the seedlings by using a marked rope or small pole to get uniform distance (Plate 6). This not only saves the amount of seeds required, but also reduces the competition for nutrients, water and sunlight. This gives roots plenty of space to spread out, resulting in a large number of tillers and facilitates easier weeding.

Step 3


Plate 5


Plate 6

Step 4

After transplanting, leave the field moist but without flooding for at least 12-14 days (Plates 7, 8). This allows seedlings to adapt to their new environment. This should be followed by alternate wetting and drying (AWD) until the flowering stage (more at Step 5). SRI fields usually appear terrible for about a month or so (Plate 8). But after this time, it will prosper.

Step 4


Plate 7


Plate 8

Step 5

In a flooded rice field, plant roots die due to lack of oxygen. So SRI recommends a series of wetting and drying cycles (Plates 9, 10 & 11) until the end of the vegetative stage. This can be done by flooding the field for 3-6 days, and then draining the field and letting it dry out for a similar number of days, or less depending on the weather condition, to the extent of surface cracking (except for clay soil, which needs to be kept at least moist). This wetting and drying process allows the plant roots to grow well by accessing both adequate water and air. This saves water as compared to the conventional method and results in better plant and root growth. In the reproductive stage, after flowering, a water level of 3-5 cm should be maintained prior to 2 weeks of harvest, although with good root growth, AWD can continue.


Plate 9


Plate 10


Plate 11

Step 6


Plate 12


Plate 13

Step 6

Carry out the first weeding at about 12-14 days after transplanting using a rotary weeder (Plates 12 and 13) if possible. This implement not only aerates the soil but also controls weeds by turning them into soil. Subsequent weedings should be done at intervals of about 2 weeks, until the canopy closes.

Step 7

SRI recommends use of FYM (Plates 14 and 15) or compost made from decomposed biomass (straw, etc.). Their application not only improves soil structure but also enhances the number and diversity of useful soil organisms in the field. This method for improving soil fertility supports organic farming, combats deteriorating soil health, deals with environmental quality concerns, and counters the increasing cost of cultivation.

Step 7


Plate 14


Plate 15

Steps 1 through 7 should give results as shown in Plates 16, 17, 18, and 19:

Plate 16


Plate 17


Plate 18


Plate 19

Larger root systems, bigger and healthier plants, profused tillering from a single seedling, and finally a bumper harvest for the SRI farmers.

Apart from these benefits, other positive aspects of SRI are: higher milling outturn (by about 15%), better grain quality, greater pest and disease resistance, more tolerance for lodging and drought, and reduced grain maturity time by 1-2 weeks. SRI techniques, although the name implies that they work for rice only, are being adapted in India to improve other crops such as wheat, finger millet, sugarcane and mustard.

There is nothing magical about SRI; nonetheless, it produces “More Output with Less Inputs.” Hence, it is a resource-conserving technique of rice production that is good for farmers, consumers, and the environment.

Created in May 2008